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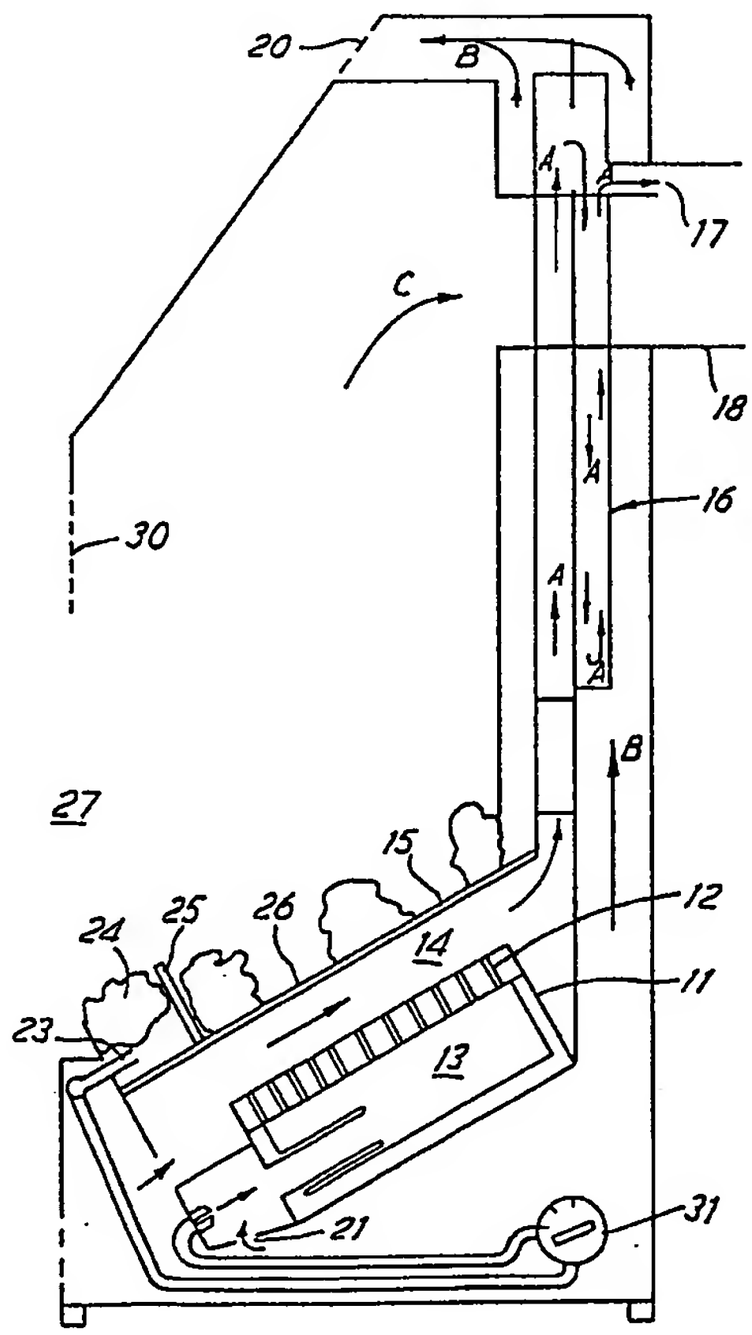
(54) Simulated solid fuel gas fire

(57) A gas fire has a main plaque type burner (11) and a transparent or translucent e.g. glass wall (15) spaced therefrom to form a closed combustion chamber (14). A heat exchanger receives gas directly from the chamber (14) without dilution. Wall (15) supports spaced fuel simulations (24) which allow the wall (15) to be seen therebetween. The wall glows red in use and enhances the appearance of the fuel simulation. Secondary burner (23) burns lightly aerated gas in an open combustion area to look like open fire flames. The closed combustion chamber of the main burner achieves a high efficiency, the overall efficiency being a combination of this and the low efficiency achieved by the secondary burner.



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The drawing(s) originally filed was (were) informal and the print here reproduced is taken from a later filed formal copy.
The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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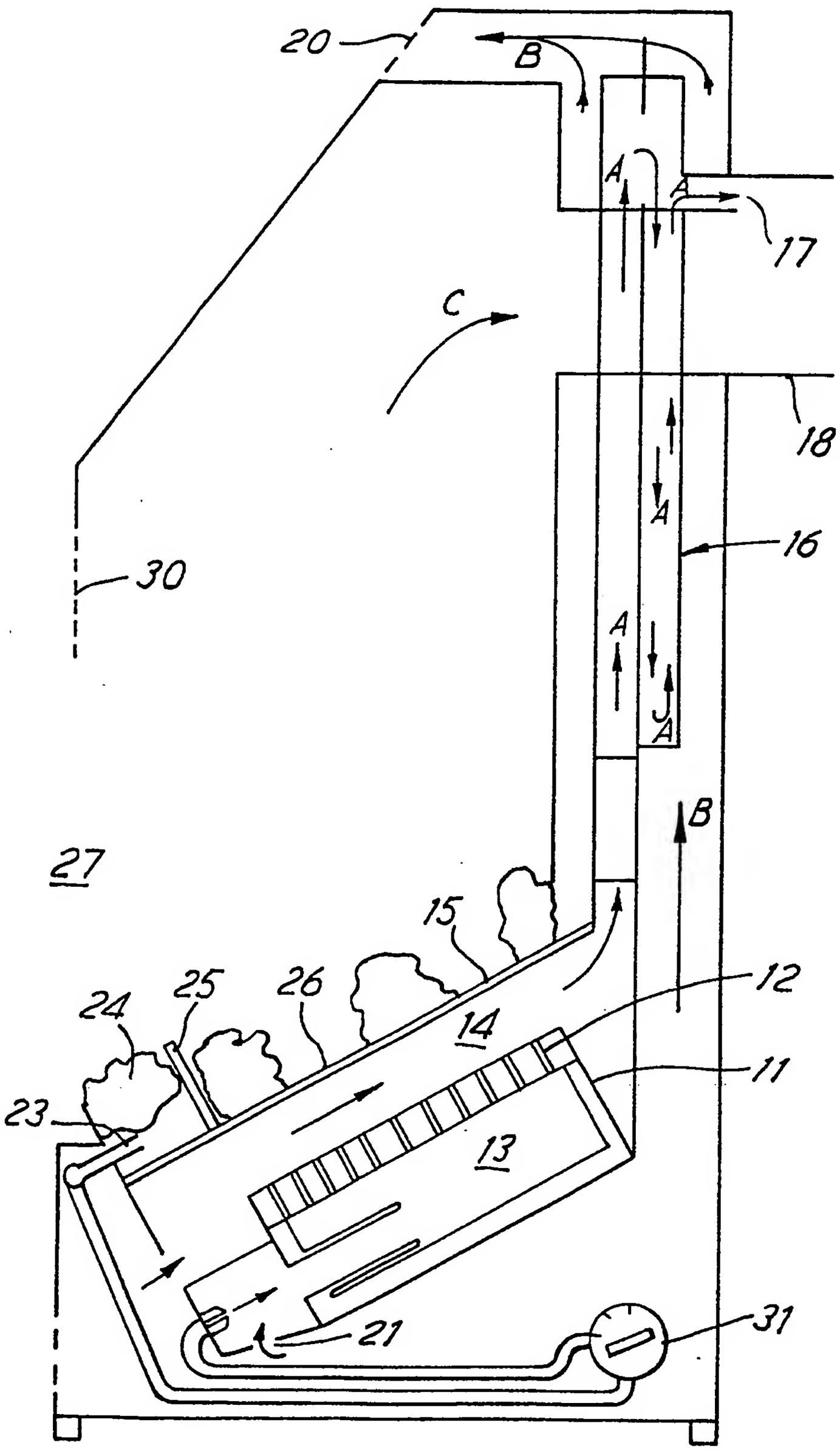

SPECIFICATION

Gas-fired heating appliance

This invention relates to a gas-fired heating appliance of the kind providing a simulation of a real fire.

The invention provides a gas-fired heating appliance having a main burner, a closed combustion chamber therefor and a heat exchanger located to receive exhaust gases from the combustion chamber, an upper wall of said combustion chamber being formed of transparent or translucent material and lying at an angle inclined to the horizontal, non-burning fuel simulation means located above said upper wall leaving spaces through which the said upper wall can be seen, and a secondary burner, providing floppy flames in an open combustion area to play among fuel simulation means.

The said main burner may be a plaque burner, lying at the same inclined angle, the transparent wall being spaced from the upper surface of the plaque to form said combustion chamber. The combustion chamber may have an opening at its lower end for the entry of combustion air.

The appliance may have an exhaust connected to receive exhaust gases from the heat exchanger and from the secondary burner so that the exhaust gases from the main burner do not mix with those from the secondary burner until after the heat exchanger.

A specific example of the invention is shown in the accompanying drawing which shows a diagrammatic side section through a gas fire.

The main burner of the fire comprises a ceramic plaque (11) having a plurality of open channels (12) through which gas flows from mixing chamber (13) to burn in combustion chamber (14). The combustion chamber (14) is closed between the upper surface of the plaque and a heat-resistant transparent glass sheet (15) spaced therefrom. The sheet and plaque are located at an angle to the horizontal of about 30° so that the combustion chamber is inclined upwardly from the front to the back of the fire. At the back of the fire a heat exchanger (16) receives the exhaust gases from combustion chamber (14) and passes them along the paths indicated by arrows A until they emerge at exit (17) and enter an exhaust duct (18).

An opening (21) at the front end of combustion chamber (14) allows combustion air to enter the chamber. It will be seen that combustion is confined in the combustion chamber and the amount of combustion air is controlled by the size of the opening (21). The exhaust gases follow the confined paths in the heat exchanger and do not emerge to be diluted until they reach exit (17). The exhaust gases therefore maintain their high temperature and heat exchange takes place under favourable temperature differentials. Thus a highly efficient heat output is achieved for this part of the fire.

Convected air heated by the heat exchanger passes along the path indicated by arrows B and emerges into the space being heated by the fire at outlet (20).

In order to provide the appearance of burning fuel, there is a secondary burner (23) which burns lightly aerated gas, i.e. gas just sufficiently aerated to produce floppy flames which look like those of burning coal. The burner (23) is directed backwardly and upwardly at an angle, preferably parallel to the combustion chamber (14), into an open combustion area. A plate (25) intercepts the flame from the burner and thus causes it to spread outwardly and upwardly. Above the burner (23) and along the front of the fire are separate lumps of artificial coal (24), i.e. ceramic non-burning representations of coal. These hide the burner and provide spaces so that the flame from the burner flickers between them and looks like a coal burning fire. Although only one burner (23) is shown, there may be a plurality of burners, e.g. three spaced along the front of the fire.

Behind plate (25), a plurality of separate coal simulations are located on the glass sheet (15). The coal simulations are separated so that areas (26) of the glass can be seen. For instance, it may be arranged that 25% to 60% of the glass is not covered by coal simulations. When burner (11) is alight, the surface of the plaque burner glows red and can be seen through the glass sheet. The actual flames in the combustion chamber also contribute to the glow. The glass chosen is 95% transparent to infra-red radiation so that radiant heat from and through the sheet helps to heat the room space. Moreover, the red glow, seen between the coal simulations, looks very much like a glowing firebed.

The overall representation of a fire therefore comprises a combination of coal simulations on a glowing red firebed with real flames at the front flickering between coal simulations.

The exhaust gases from the burner (23) follow arrow C into exhaust (18) where they join the exhaust gases from the heat exchanger. The fire has an open front (27) through which the representation is viewed and through which heat is radiated. The open front means that air is entrained with the exhaust gases from burner (23) so that the exhaust gases are cooled. However, these gases are not mixed with the exhaust gases from the plaque until after these gases have passed through the heat exchanger. Thus the efficiency of heat transfer in the heat exchanger is not adversely affected. A partial glass canopy (30) may reduce the entrained air, but the majority of the front of the fire is open.

The gas supply to burners (23) and (11) is controlled from manual control valve (31). This provides a number of different settings giving different gas flows to the plaque burner (11) so that different heat levels can be attained. All of these positions are accompanied by flow through the burner (823) so that the fuel simulation is maintained. There is also a low, fuel simulation, setting of control valve (31) in which the plaque burner is not operating, only valve (23) being supplied with gas. In this position the fire operates as a decorative fuel simulation, with only a very low heat output.

As described above, the plaque burner (11) operates under tightly controlled conditions, so that the heat exchanger can effect a high local efficiency. The fuel effect burner (23) operates in open conditions producing very little heat. The overall efficiency of the fire is a combination of these two efficiencies, the

fuel effect burner reducing the attained overall efficiency. However, it is still possible to achieve efficiencies of the order of 66% on settings other than the low, fuel simulation only, setting. By locating the high efficiency closed burner to form the base of a fuel effect and making one wall thereof transparent, it has proved possible to make a high efficiency burner part of a simulation of a real fire. The inevitable high temperature achieved in the gas combustion chamber is thus used to provide a glow for the fuel simulation.

Although coal simulations have been described above, the simulations could be of logs or coke.

CLAIMS

1. A gas-fired heating appliance having a main burner means, a closed combustion chamber therefor, and a heat exchanger located to receive exhaust gases from the combustion chamber, an upper wall of said combustion chamber being formed of transparent or translucent material and lying at an angle inclined to the horizontal, non-burning fuel simulation means located on or above said upper wall leaving spaces through which the said upper wall can be seen, and a secondary burner means for providing floppy flames in another, open, combustion area to play about the fuel simulation means.

2. A heating appliance as claimed in claim 1, wherein said main burner means is a plaque burner, the transparent or translucent wall being spaced from the upper surface of the plaque to form therewith said closed combustion chamber.

3. A heating appliance as claimed in claim 1 or claim 2, wherein said closed combustion chamber has an opening at one end for the entry of combustion air and is connected at the other end to the heat exchanger.

4. A heating appliance as claimed in claim 2 or claim 3, wherein said plaque and said wall are both inclined at an angle of about 30° to the horizontal.

5. A heating appliance as claimed in any of claims 1 to 4, wherein said secondary burner means is located at the front of the appliance and directed backwardly and upwardly.

6. A heating appliance as claimed in claim 5, having a plate positioned in the flame path of said secondary burner means so as to intercept flames and cause them to spread.

7. A heating appliance as claimed in claim 6, wherein said fuel simulation means includes a plurality of separate simulations located above the secondary burner means along the front of the appliance.

8. A heating appliance as claimed in any of claims 1 to 7, wherein said fuel simulation means includes a plurality of separate simulations located on said wall, leaving 25% - 60% of the wall surface uncovered.

9. A heating appliance as claimed in any of claims 5 to 7, wherein the majority of the front of the fire is open allowing air to be supplied to said secondary burner means.

10. A heating appliance as claimed in any of claims 1 to 9, having an exhaust duct connected to receive exhaust gases from the heat exchanger and from the secondary burner means so that the exhaust gases from the main burner means do not mix with those from the secondary burner means until after their passage through the heat exchanger.

11. A heating appliance as claimed in any of claims 1 to 10, wherein said wall is formed of heat-resistant glass.

12. A heating appliance substantially as described hereinbefore with reference to the accompanying drawing.

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